

CLAIMS

1. A surface-coated cutting tool (1), comprising:
a base material (2); and
5 a coated film (3) formed on said base material (2); wherein
said coated film (3) serves as an outermost layer on said base material (2) and
has compressive stress,
said compressive stress is varied so as to have strength distribution in a direction
of thickness of said coated film (3), and
10 said strength distribution is characterized in that the compressive stress at a
surface (4) of said coated film continuously increases from said surface (4) of said
coated film toward a first intermediate point (5) located between said surface (4) of said
coated film and a bottom surface (6) of said coated film and the compressive stress
attains a relative maximum point at said first intermediate point (5).
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2. The surface-coated cutting tool (1) according to claim 1, wherein
said strength distribution is characterized in that a minimum compressive stress is
attained at said surface (4) of said coated film and the compressive stress maintains a
constant value from said first intermediate point (5) to said bottom surface (6) of said
20 coated film.
3. The surface-coated cutting tool (1) according to claim 2, wherein
said compressive stress is stress in a range from at least -15GPa to at most 0GPa .
- 25 4. The surface-coated cutting tool (1) according to claim 2, wherein
said first intermediate point (5) is located at a position distant from said surface
(4) of said coated film by at least 0.1% to at most 50% of the thickness of said coated
film (3).

5. The surface-coated cutting tool (1) according to claim 2, wherein
said compressive stress at said surface (4) of said coated film is set to a value
comparable to 25 to 95% of the compressive stress at said first intermediate point (5) of
5 said coated film (3).

6. The surface-coated cutting tool (1) according to claim 5, wherein
said compressive stress at said surface (4) of said coated film is set to a value
comparable to 35 to 85% of the compressive stress at said first intermediate point (5) of
10 said coated film (3).

7. The surface-coated cutting tool (1) according to claim 2, wherein
said compressive stress attains minimum at said surface (4) of said coated film,
the minimum compressive stress is maintained across a prescribed distance from said
15 surface (4) of said coated film toward said first intermediate point (5), and thereafter
said compressive stress continuously increases toward said first intermediate point (5).

8. The surface-coated cutting tool (1) according to claim 1, wherein
said strength distribution is characterized in that said compressive stress
20 continuously decreases from said first intermediate point (5) toward said bottom surface
(6) of said coated film.

9. The surface-coated cutting tool (1) according to claim 8, wherein
said compressive stress is the stress in a range from at least -15GPa to at most
25 0GPa .

10. The surface-coated cutting tool (1) according to claim 8, wherein
said first intermediate point (5) is located at a position distant from said surface

(4) of said coated film by at least 0.1% to at most 50% of the thickness of said coated film (3).

5 11. The surface-coated cutting tool (1) according to claim 8, wherein said compressive stress attains minimum at said surface (4) of said coated film.

10 12. The surface-coated cutting tool (1) according to claim 8, wherein said compressive stress at said surface (4) of said coated film is set to a value comparable to 25 to 95% of the compressive stress at said first intermediate point (5) of said coated film (3).

15 13. The surface-coated cutting tool (1) according to claim 12, wherein said compressive stress at said surface (4) of said coated film is set to a value comparable to 35 to 85% of the compressive stress at said first intermediate point (5) of said coated film (3).

20 14. The surface-coated cutting tool (1) according to claim 8, wherein said compressive stress at said surface (4) of said coated film is maintained across a prescribed distance from said surface (4) of said coated film toward said first intermediate point (5), and thereafter said compressive stress continuously increases toward said first intermediate point (5).

25 15. The surface-coated cutting tool (1) according to claim 1, wherein said strength distribution is characterized in that said compressive stress continuously decreases from said first intermediate point (5) toward a second intermediate point (9) located between said first intermediate point (5) and said bottom surface (6) of said coated film and attains a relative minimum point at said second intermediate point (9).

16. The surface-coated cutting tool (1) according to claim 15, wherein said compressive stress is the stress in a range from at least -15GPa to at most 0GPa .

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17. The surface-coated cutting tool (1) according to claim 15, wherein said first intermediate point (5) is located at a position distant from said surface (4) of said coated film by at least 0.1% to at most 50% of the thickness of said coated film (3).

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18. The surface-coated cutting tool (1) according to claim 15, wherein said second intermediate point (9) is located at a position distant from said surface (4) of said coated film by at least 0.2% to at most 95% of the thickness of said coated film (3).

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19. The surface-coated cutting tool (1) according to claim 15, wherein said compressive stress attains minimum at said surface (4) of said coated film.

20. The surface-coated cutting tool (1) according to claim 15, wherein said compressive stress at said surface (4) of said coated film is set to a value comparable to 25 to 95% of the compressive stress at said first intermediate point (5) of said coated film (3).

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21. The surface-coated cutting tool (1) according to claim 20, wherein said compressive stress at said surface (4) of said coated film is set to a value comparable to 35 to 85% of the compressive stress at said first intermediate point (5) of said coated film (3).

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22. The surface-coated cutting tool (1) according to claim 15, wherein
said compressive stress at said surface (4) of said coated film is maintained
across a prescribed distance from said surface (4) of said coated film toward said first
intermediate point (5), and thereafter said compressive stress continuously increases
5 toward said first intermediate point (5).

23. The surface-coated cutting tool (1) according to claim 1, wherein
said strength distribution is characterized in that said compressive stress
continuously decreases from said first intermediate point (5) toward a second
10 intermediate point (9) located between said first intermediate point (5) and said bottom
surface (6) of said coated film and attains a relative minimum point at said second
intermediate point (9), and said strength distribution has one or more similar said
relative maximum point between said second intermediate point (9) and said bottom
surface (6) of said coated film.

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24. The surface-coated cutting tool (1) according to claim 23, wherein
said strength distribution has one or more similar said relative minimum point
between said second intermediate point (9) and said bottom surface (6) of said coated
film.

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25. The surface-coated cutting tool (1) according to claim 23, wherein
said strength distribution has one or more said similar relative maximum point
and one or more said similar relative minimum point in an alternate and repeated manner
in this order between said second intermediate point (9) and said bottom surface (6) of
25 said coated film.

26. The surface-coated cutting tool (1) according to claim 23, wherein
said compressive stress is the stress in a range from at least -15GPa to at most

0GPa.

27. The surface-coated cutting tool (1) according to claim 23, wherein
said first intermediate point (5) is located at a position distant from said surface
5 (4) of said coated film by at least 0.1% to at most 40% of the thickness of said coated
film (3).

28. The surface-coated cutting tool (1) according to claim 23, wherein
said second intermediate point (9) is located at a position distant from said
10 surface (4) of said coated film by at least 0.2% to at most 80% of the thickness of said
coated film (3).

29. The surface-coated cutting tool (1) according to claim 23, wherein
said compressive stress attains minimum at said surface (4) of said coated film.
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30. The surface-coated cutting tool (1) according to claim 23, wherein
said compressive stress at said second intermediate point (9) of said coated film
(3) is set to a value comparable to 10 to 80% of the compressive stress at said first
intermediate point (5) of said coated film (3).
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31. The surface-coated cutting tool (1) according to claim 30, wherein
said compressive stress at said second intermediate point (9) of said coated film
(3) is set to a value comparable to 20 to 60% of the compressive stress at said first
intermediate point (5) of said coated film (3).
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32. The surface-coated cutting tool (1) according to claim 23, wherein
said compressive stress at said surface (4) of said coated film is maintained
across a prescribed distance from said surface (4) of said coated film toward said first
intermediate point (5), and thereafter said compressive stress continuously increases
30 toward said first intermediate point (5).